

Amendments to the Drawings:

The attached sheets of drawings include changes to **Figure 7**. Replacement sheet page 4, which includes **Figure 7** replaces the original page 4 including **Figure 7**. **Figure 7** has been amended to reflect the correct mathematical formula in step **708**.

Attachment: Replacement Sheet for Figure 7
Annotated Sheet for Figure 7

REMARKS/ARGUMENTS

Claims 1-20 are pending in the present application. Claims 1, 6, 9, 14, and 17-20 have been amended; claims 2-3, 7-8, 10-11, and 15-16 have been canceled. Support for the amendments to the claims can be found at least in the canceled claims and the specification at p. 16, ll. 16-18. Amendments were made to the specification to correct errors and to clarify the specification. No new matter has been added by any of the amendments to the specification. Support for the amendment to the specification can be found at least in the specification at p. 16, ll. 16-18. Amendments were made to figure 7 to correct errors. Support for the amendment to the figure can be found at least in the specification at p. 16, ll. 16-18. Reconsideration of the claims is respectfully requested.

I Interview Summary

Applicants thank Examiner Ilwoo Park for the courtesies extended to Applicants' representative during the November 7, 2006 telephone interview. During the interview, Applicants' representative discussed the possible amendments to overcome the 35 U.S.C. § 112, second paragraph rejection of claims 7 and 15. No agreement was reached as to the allowability of those claims.

II 35 U.S.C. § 101

The Examiner has rejected claims 17-18 under 35 U.S.C. § 101 as being directed towards non-statutory subject matter.

The Examiner has rejected these claims stating:

The claimed invention is directed to non-statutory subject matter. Claims 17 and 18 are not limited to tangible embodiments. In view of Applicant's disclosure, specification page 18, lines 13-22, the medium is not limited to tangible embodiments, instead being defined as including both tangible embodiments (e.g., CD-ROM) and intangible embodiments (e.g., wireless communication). As such, the claims are not limited to statutory subject matter and are therefore non-statutory.
Office Action dated August 15, 2006, p. 2.

Section 101 of Title 35 U.S.C. sets forth the subject matter that can be patented:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

"[N]o patent is available for a discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101." *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 483, 181 USPQ 673,679 (1974). The statutory categories of § 101 define

eligible (patentable or statutory) subject matter, i.e., subject matter that can be patented. The listed statutory categories of invention are “process, machine, manufacture, or composition of matter.”

Claim 17 is representative of all claims in this group and recites:

17. A computer program product in a computer readable medium for transferring data from a memory to a network adapter, the computer program product comprising:
first instructions for receiving a request to transfer data in the memory to a network adapter;
second instructions for setting a transfer size to align the data with a cache line size if the amount of data to be transferred is unequal to the cache line size, wherein an amount of data is less than or equal to the transfer size, and wherein the amount of data to be transferred is in a frame and has a frame size; and
third instructions for setting a valid length indicator, wherein the valid length indicator is set to the amount of data and wherein the network adapter outputs only the amount of data set by the valid length indicator after the data has been transferred to the network adapter.

In the present case, claim 17 clearly and unquestionably recites a “product,” an article of manufacture, embodied in a tangible computer usable medium, implementing the method of claim 1. Section 100(b) of Title 35 U.S.C. defines “process” to mean, “process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.” The definition of “process” to mean “process, art or method” makes it clear that the terms are synonymous. *See*, S. Rep. No. 1979, reprinted in 1952 U.S. Code Cong. & Admin. News at 2409-10. The Office cannot creatively redefine the claimed invention to be something other than what is explicitly recited in the claim for the sole purpose of rejecting the claim, and in this case, claim 1 recites a method. Therefore, the invention of claim 1 falls within the statutory categories of patentable subject matter because the claim recites a method. Therefore, claim 17 which claims a product implementing the method of claim 1 is also directed to statutory subject matter under 35 U.S.C. § 101.

Furthermore, the invention of claim 17 is patentable in view of new guidelines covering patentability of claims directed to a process in a computer readable medium. The USPTO Guideline for evaluating computer-readable medium encoded with functional descriptive material, such as a computer program, expressly states that a claim to such computer-readable medium when so encoded is statutory subject matter. USPTO, *Interim Guideline for Examination of Patent Application for Patent Subject Matter Eligibility* (26 Oct. 2005) (hereinafter “the Guideline”). The Guideline provides, in relevant part:

“[A] claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure’s functionality to be realized, and is thus statutory.”

Id., p. 52.

The Guideline further provides:

Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in § 101.

...

These interim guidelines propose that such signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of § 101. Public comment is sought for further evaluation of this question.

Id., pp. 55-56.

Claim 17 is directed to a computer program product in a computer readable medium. As the Guideline provides, “a computer readable medium with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure’s functionality to be realized” is statutory. Because claim 17 recites a computer program product in a computer readable medium, along with the other recited steps, claim 17 does describe a data structure that defines structural and functional interrelationships between the data structure and the computer software and hardware components, which permit the data structure’s functionality to be realized. Thus, claim 17 is patentable subject matter under 35 U.S.C. § 101, as explained under the Guideline.

The claim recites a “computer readable medium” in which a signal is embedded. Claim 17 claims functional descriptive material encoded on a computer readable medium and does not claim signals encoded with functional descriptive material. For this additional reason, claim 17 falls under allowable statutory matter under 35 U.S.C. § 101.

Claim 17 comprises statutory subject matter because the claim is directed towards the medium, and not to the radio frequency or the light wave signals that may inherently be used in such media technologies. The use of radio frequency or light wave as a method of encoding or recording the computer program onto such medium does not render the medium itself nonstatutory. Even in case of a CD-ROM, a laser form of light wave is used for accomplishing the encoding/recording of the information on to the CD-ROM, yet the CD-ROM remains a well-accepted computer readable medium. Encoding the air or glass fiber medium with radio frequency or light wave similarly cannot render the air or glass fiber medium nonstatutory under § 101.

Thus, claim 17 is statutory under 35 U.S.C. § 101. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 17-18 under 35 U.S.C. § 101.

III 35 U.S.C. § 112, First Paragraph

The Examiner has rejected claims 7 and 15 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Claims 7 and 15 have been canceled and their features included in claims 6 and 14 respectively. Those features have been corrected to recite the correct mathematical formula to ensure that the amount of data transferred is divisible by the CLS, as stated in the specification on p. 16, ll. 16-18. Applicants respectfully urge that the basis of rejection of claims 7 and 15 no longer exists as to those features, as incorporated in claims 6 and 14.

IV 35 U.S.C. § 102, Anticipation

The Examiner has rejected claims 1-2, 4-6, 9-10, 12-14, and 17-20 under 35 U.S.C. § 102(b) as being anticipated by *Chen et al*, System for Transferring Length Round Down to Cache Line Multiple Capable to Determine Type of Read Request Which Selects and Reads Portion of Prefetched Data in Memory, United States Patent No. 6,055,580 (issued, April 25, 2000), (hereinafter, “*Chen*”). This rejection is respectfully traversed.

Claim 1 has been amended to include the features of claim 2 and claim 2 now stands canceled. For this reason, the rejection of claim 1 and claim 2 are treated together in the analysis below. The Examiner has rejected claims 1-2 stating:

As for claim 1, *Chen et al* teach a method in data processing system for transferring [col. 7, lines 62-65] data from a memory [e.g., main memory 104, cache 105] to a network adapter [network interface card 124], the method comprising:

receiving [col. 7, lines 62-65] a request to transfer data in the memory to a network adapter; and

setting a transfer size to align [col. 3, lines 21-25; col. 3, lines 42-45; col. 9, lines 43-59] the data with a cache line size if the amount of data to be transferred is unequal [col. 3, line 17-21] to the cache line size, wherein an amount of data is less than or equal to the transfer size.

6. As for claim 2, *Chen et al* teach the amount of data to be transferred is in a frame and has a frame size [col. 9, lines 43-59].

Office Action dated August 15, 2006, p. 3-4.

A prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 32 U.S.P.Q.2d 1031, 1034 (Fed. Cir. 1994). Anticipation focuses on whether a claim reads on the product or process a prior art reference discloses, not on what the reference broadly teaches. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983). In this case, each and every feature of the

presently claimed invention is not identically shown in the cited reference, arranged as they are in the claims.

Amended claim 1 recites:

1. A method in a data processing system for transferring data from a memory to a network adapter, the method comprising:
 - receiving a request to transfer data in the memory to a network adapter; and
 - setting a transfer size to align the data with a cache line size if the amount of data to be transferred is unequal to the cache line size, wherein an amount of data is less than or equal to the transfer size, and wherein the amount of data to be transferred is in a frame and has a frame size.

Chen does not teach, “the amount of data to be transferred is in a frame and has a frame size.”

This feature was originally recited in claim 2 and is now incorporated into claim 1. The Examiner rejected claim 2 believing that this feature is taught in the following section of *Chen*:

Referring still to FIG. 6, in one embodiment, at step 502 of FIG. 5, NIC 124 receives information which is intended to trigger NIC 124 to generate a read request for data which will occupy a first block of memory having a first size. In this embodiment, the data, if prefetched in its entirety to cache 105, will occupy a first block of memory shown as block 624. That is, in order to prefetch and store the data, in its entirety, the entire memory (e.g. the entire cache line of units 602, 604, 606, 608 and 610 will be required. In the embodiment of FIG. 6, portion 618 comprises 2 bytes of cache memory. Because read operations such as MR, MRL, and MRM operations are inherently cache line based, in many conventional operations, the memory subsystem of the host computer 100, will write extraneous data into the unused portion 622 of unit 610 during the prefetch operation. Such extra activity introduces unwanted extra CPU utilization during the prefetch operation.

Chen, Col. 9, ll. 43-59.

In this section, *Chen* describes the figure 6 in *Chen*'s disclosure, reproduced and explained below. Here, *Chen* describes how the data that is being read by a network interface card (NIC) from a memory is organized in the memory. *Chen* describes the memory blocks read from cache as a result of the read operation.

Chen's figure 6 is as follows:

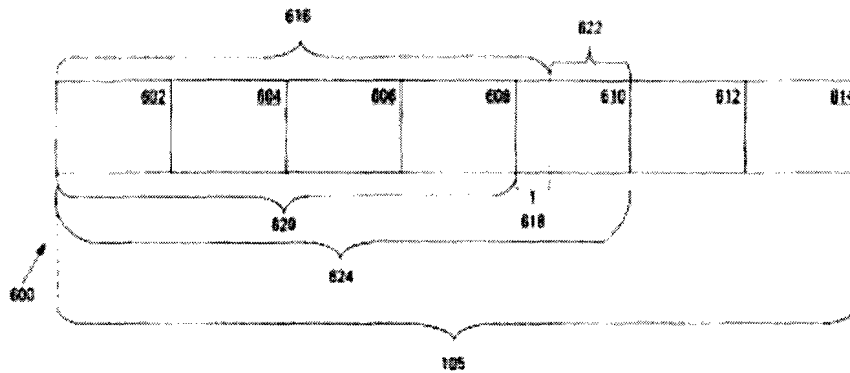


FIGURE 6

Chen, Figure 6.

The figure shows a section of the cache in *Chen's* system where the cache lines are demarcations between the memory units **602-614**. The figure shows that the read operation described in the section quoted above targets the data identified by **616**. Data **616** is shown to occupy memory units **602-608** completely, but unit **610** only partially. However, *Chen* contains no teaching that describes data **616** to have a certain form or size associated with that form. *Chen* has only described as an example that the memory units are 32 bytes long and the portion of data **616** residing in the memory unit **610** is 2 bytes long. This exemplary description makes the size of data **616** 130 bytes long. 130 bytes is not known to be a frame size in the pertinent art of network data transfer using network interface cards.

In the description as well as the associated figure in *Chen* cited by the Examiner, no teaching is present as to the requirement that the amount of data to be transferred in the read operation is in a frame or has a frame size. Obviously, any data transfer has an associated size that inherently identifies the size of the data being transferred. However, a specific requirement that the transferred data be in a frame and that the frame have a frame size is not inherent in a data transfer. A data transfer can be undertaken in

numerous forms, not necessarily in the form of a “frame”, which is commonly used in data transfer using network adapters.

Therefore, a data transfer in *Chen* is not in the form of a frame with a frame size because no such teaching or disclosure is present in *Chen*. In contrast, the amended claim 1 recites, “the amount of data to be transferred is in a frame and has a frame size.” Therefore, *Chen* fails to teach this feature of the amended claim 1. Consequently, *Chen* does not anticipate claim 1 under 35 U.S.C. § 102(b).

Because independent claims 9, 17, and 19 contain features and amendments similar to those in independent claim 1, *Chen* also fails to anticipate these claims. Claims 4-5 and 12-13 are also not anticipated by *Chen* at least by virtue of their dependence from one of these independent claims.

As to claim 6, the Examiner states:

9. As for claim 6, *Chen* et al teach a method in data processing system for transferring [col. 7, lines 62-65] data from a memory [e.g., main memory 104, cache 105] to a network adapter [network interface card 124], the method comprising:

- identifying [col. 8, lines 48-54] a frame size for a transfer of the data from the memory to the network;
- setting [col. 9, lines 49-51] a length equal to a cache line size;
- if the frame size is divisible by a cache line size without a remainder,
- setting a valid data length equal to the length field [col. 3, lines 39-45]; and
- if the frame size divided by the cache line size results in a remainder,
- setting a valid data length equal to the length field [col. 3, lines 39-45].

Office Action date August 15, 2006, page 4.

Claim 6 recites:

6. A method in a data processing system for transferring data from a memory to a network adapter, the method comprising:

- identifying frame size for a transfer of the data from the memory to the network adapter;
- setting a length equal to a cache line size;
- if the frame size is divisible by a cache line size without a remainder, setting a valid data length equal to the length field; and
- if the frame size divided by the cache line size results in a remainder, setting the length field to align the data with the cache line size, wherein the length field is computed as
$$\text{length field} = (\text{FLOOR}(\text{frame size}/\text{CLS}) + 1) * \text{CLS},$$

wherein CLS is the cache length size.

Chen does not teach, “if the frame size divided by the cache line size results in a remainder, setting the length field to align the data with the cache line size, wherein the length field is computed as $\text{length field} = (\text{FLOOR}(\text{frame size}/\text{CLS}) + 1) * \text{CLS}$, wherein CLS is the cache length size” features of claim 6. The Examiner cites to the following section of *Chen* as teaching these features:

The present invention further provides a system and method which takes advantage of a PCI-based system’s inherent use of memory line sizes and boundaries during data transfers. The above accomplishments are achieved with

a system and method which issues a read request which rounds down the length of data being transferred such that the data ends on a memory boundary.
Chen, Col. 3, ll. 39-45.

This section in *Chen* describes that when a read request requests data that is outside of the last full memory unit, i.e., is past the last memory boundary, the length of data being transferred is rounded down to end on a memory boundary. For example, in the above reproduced *Chen*'s figure 6, the read requested data 616 will have its length rounded down to 128 from 130 so that the read data ends on the boundary of the memory unit 608.

If the combination of frame size and cache line size in a particular system were such that the frame would not end on a memory boundary, the last block of memory will only be partially filled. Here, the teachings of *Chen* and the recitations of claim 6 differ in the actions taken. *Chen*'s section cited by the Examiner essentially removes the partially filled last block of memory because *Chen* teaches "rounding down" the length of data to end on a memory boundary. In contrast, claim 6 recites, $\text{length field} = (\text{FLOOR}(\text{frame size}/\text{CLS})+1)*\text{CLS}$, which essentially "rounds up" the length of data to end on the next memory boundary which is at the end of the partially filled memory unit. Again using *Chen*'s figure 6 as an example, *Chen* teaches making the data length 128 so that the data ends on the upper boundary of memory unit 608, whereas the claim recitation makes the data length 160 so that the data ends on the upper boundary of memory unit 610. Therefore, the teachings on *Chen*'s disclosure and the recited feature of claim 6 are distinct from each other. Consequently, *Chen* does not anticipate claim 6 under 35 U.S.C. § 102(b).

Because independent claims 14, 18, and 20 contain features and amendments similar to those in independent claim 6, *Chen* also fails to anticipate these claims. Claims 8 and 16 are also not anticipated by *Chen* at least by virtue of their dependence from one of these independent claims.

V 35 U.S.C. § 103, Obviousness

The Examiner has rejected claims 3, 8, 11, and 16 under 35 U.S.C. § 103(a) as being unpatentable over *Chen*, in view of *Webber et al.*, System and Method for Building Packets, United States Patent No. 6,820,186 (Published, November 16, 2004) (hereinafter, "*Webber*"). The rejection is moot because these claims stand canceled.

VI Conclusion

Applicants respectfully urge that the subject application is patentable over *Chen* and *Webber*, and is now in condition for allowance.

The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,

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